

MATH 1010
EXAM 1 REVIEW

$$\begin{aligned} 1. & 4x - [8 - (2x - 3)] \\ &= 4x - (8 - 2x + 3) \\ &= 4x - 8 + 2x - 3 \\ &= \boxed{6x - 11} \end{aligned}$$

$$\begin{aligned} 2. & -5x + 4 = -16 \\ & \quad -4 \quad -4 \\ \hline & -5x = -20 \\ & \quad -5 \quad \quad -5 \\ \hline & \boxed{x = 4} \end{aligned}$$

$$\begin{aligned} 3. & 4(x - 2) = -2(4 - 2x) \\ & 4x - 8 = -8 + 4x \\ & -4x + 8 \quad +8 - 4x \\ \hline & 0 = 0 \end{aligned}$$

identity
 \mathbb{R}

$$\begin{aligned} 4. & 3x + 9 = 3(2x - 6) \\ & 3x + 9 = 6x - 18 \\ & -3x + 18 \quad -3x + 18 \\ \hline & 27 = 3x \\ & \quad 3 \quad 3 \\ \hline & x = 3 \end{aligned}$$

conditional
 $\{3\}$

$$\begin{aligned} 5. & 8k + 13 = 2(4k - 6) \\ & 8k + 13 = 8k - 12 \\ & -8k \quad \quad -8k \\ \hline & 13 = -12 \end{aligned}$$

contradiction
 \emptyset or $\{ \}$

$$\begin{aligned} 6. & (2, 5); \quad 2x - y = 1 \\ & 2(2) - 5 \stackrel{?}{=} 1 \\ & 4 - 5 \stackrel{?}{=} 1 \\ & -1 \neq 1 \end{aligned}$$

not a
solution

7. $\{(2, -5), (4, 3), (6, -2), (7, -5)\}$

Domain: $\{2, 4, 6, 7\}$

Range: $\{-5, -2, 3\}$

Function No member of the domain corresponds to more than one element of the range.

8. $f(-3)$ $f(x) = x^2 - 2x + 5$

$f(-3) = (-3)^2 - 2(-3) + 5$

$f(-3) = 9 + 6 + 5$

$f(-3) = 20$

9. $h(x+2)$ $h(x) = 4x + 7$

$h(x+2) = 4(x+2) + 7$

$h(x+2) = 4x + 8 + 7$

$h(x+2) = 4x + 15$

10. $f(1)$ \leftarrow what is y when $x=1$?

$f(1) = 1$

11. All values of x that produce $f(x)=0$
What is x when $y=0$?

$x=0$ & $x=2$

12. Domain: $\{x \mid -1 \leq x \leq 3\}$ or $[-1, 3]$

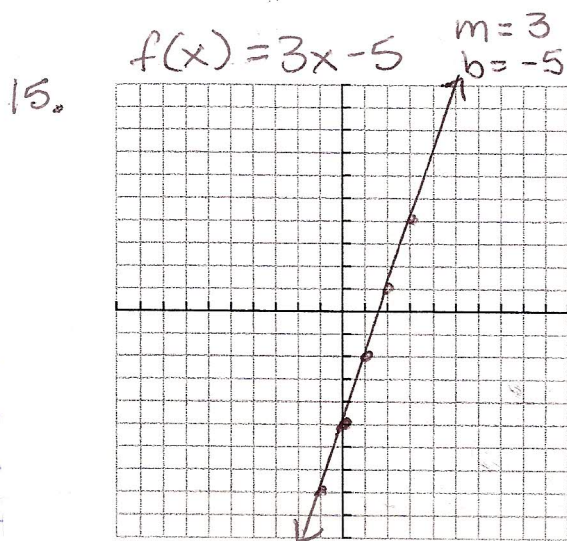
13. Range: $\{y \mid -9 \leq y \leq 3\}$ or $[-9, 3]$

14. Domain of $f(x) = \frac{2}{x-7}$ \leftarrow can't divide by 0,
so $x-7 \neq 0$

$x-7 \neq 0$

$x \neq 7$

$\{x \mid x \neq 7\}$



16. $y = 3x - 2$

slope = 3
y-int: (0, -2)

17. $(2, -6)$ & $(-3, 4)$

$$m = \frac{4 - (-6)}{-3 - 2} = \frac{10}{-5} = \boxed{-2}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

18. $(4, -7)$ & $(5, -7)$

$$m = \frac{-7 - (-7)}{5 - 4} = \frac{0}{1} = \boxed{0}$$

19. $(9, -8)$ & $(9, 1)$

$$m = \frac{1 - (-8)}{9 - 9} = \frac{9}{0} \text{ undefined}$$

20. $m = \frac{3}{4}$ $b = (0, -2)$

$y = \frac{3}{4}x - 2$

21. $C(x) = .1x + 30$ $x = \#$ of minutes used
 $m = .1 \Rightarrow$ pay 10¢ per minute
 $b = 30 \Rightarrow$ flat rate of \$30/mo
pay \$30/mo plus 10¢ per minute

22. $2x - 5y = -10$

x-int: $2x - 5(0) = -10$

$2x = -10$

$x = -5$

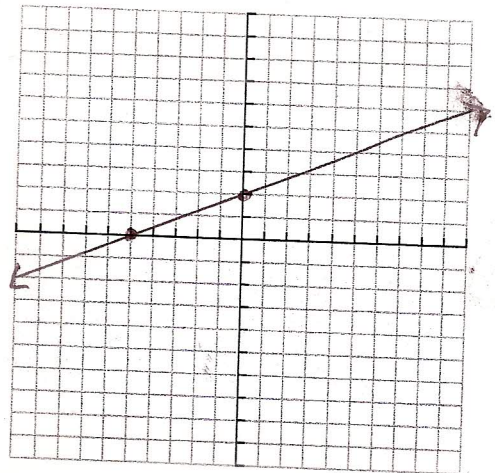
$(-5, 0)$

y-int: $2(0) - 5y = -10$

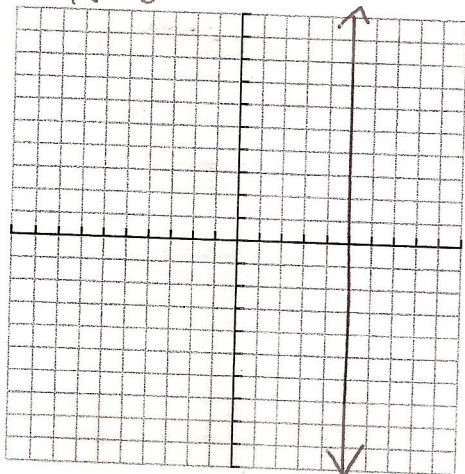
$-5y = -10$

$y = 2$

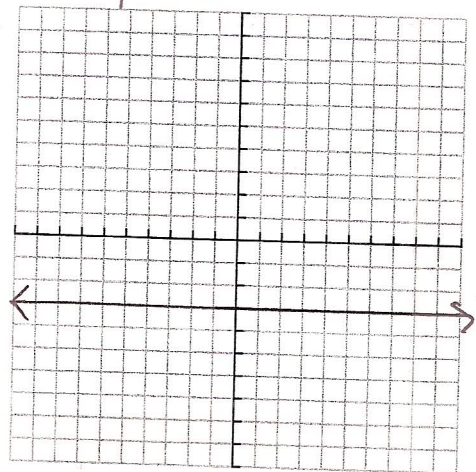
$(0, 2)$



23. $x = 5$



24. $y = -3$



25. $m = 1/3; (4, -2)$

$y - y_1 = m(x - x_1)$

$y - (-2) = 1/3(x - 4)$

$y + 2 = 1/3(x - 4)$

26. $(2, 3) \quad (-2, 1)$

$$m = \frac{1-3}{-2-2} = \frac{-2}{-4} = \frac{1}{2}$$

$$y - y_1 = m(x - x_1)$$

$$y - 3 = \frac{1}{2}(x - 2)$$

$$y - 3 = \frac{1}{2}x - 1$$

$$\boxed{y = \frac{1}{2}x + 2}$$

27. Through $(0, -2)$ Parallel to $4x - 2y = 6$

parallel \Rightarrow same slope

$$m = -A/B = -4/-2 = 2$$

$$y - y_1 = m(x - x_1)$$

$$y - (-2) = 2(x - 0)$$

$$y + 2 = 2x$$

$$\boxed{y = 2x - 2}$$

or realize that

$(0, -2)$ is a y-intercept, so $b = -2$ in $y = mx + b$

28. Through $(0, 5)$ perpendicular to $x + 3y = 9$

perpendicular \Rightarrow slopes are negative reciprocals.

slope of $x + 3y = 9$: $m = -A/B = -1/3$

slope of line perpendicular to $x + 3y = 9$: $m = 3$

$$y - y_1 = m(x - x_1)$$

$$y - 5 = 3(x - 0)$$

$$y - 5 = 3x$$

$$y = 3x + 5$$

or realize that $(0, 5)$ is a y-intercept, so $b = 5$ in $y = mx + b$.

29. $4x - 2y = 6$

~~2x~~ $3x + y = 7$

$$y = -3x + 7$$

$$4x - 2(-3x + 7) = 6$$

$$4x + 6x - 14 = 6$$

$$10x - 14 = 6$$

$$10x = 20$$

$$x = 2$$

$$\boxed{(2, 1)}$$

$$y = -3(2) + 7 = 1$$

$$\begin{array}{r}
 30. \quad (3x - 5y = 9)(-5) \\
 (5x - 3y = -1)(3) \\
 \hline
 -15x + 25y = -45 \\
 15x - 9y = -3 \\
 \hline
 16y = -48 \\
 y = -3
 \end{array}$$

$$\begin{array}{r}
 3x - 5(-3) = 9 \\
 3x + 15 = 9 \\
 3x = -6 \\
 x = -2
 \end{array}$$

$$\boxed{(-2, -3)}$$

$$\begin{array}{r}
 31. \quad (2x - 3y = 12)(3) \\
 -6x + 9y = -36
 \end{array}$$

$$\begin{array}{r}
 6x - 9y = 36 \\
 -6x + 9y = -36 \\
 \hline
 0 = 0
 \end{array}$$

dependent

$$\begin{array}{r}
 32. \quad (5y - 4x = 6)(-2) \\
 10y - 8x = 16
 \end{array}$$

$$\begin{array}{r}
 -10y + 8x = -12 \\
 10y - 8x = 16 \\
 \hline
 0 = 4
 \end{array}$$

inconsistent

33. wands: 2 galleons
cauldrons: 3.5 galleons
sell 36 products
make 102 galleons

$w = \#$ of wands sold
 $c = \#$ of cauldrons sold

$$\begin{array}{r}
 (w + c = 36)(-2) \\
 2w + 3.5c = 102 \\
 \hline
 -2w - 2c = -72
 \end{array}$$

They sold 16 joke wands

$$\begin{array}{r}
 1.5c = 30 \\
 1.5 \quad 1.5
 \end{array}$$

$$\begin{array}{r}
 c = 20 \\
 w = 16
 \end{array}$$

34. \$1.20/lb

\$1.50/lb

mix: 30 lb @ \$1.38/lb

c = lbs of cheap candy

e = lbs of expensive candy

$$(-1.2)(c + e = 30)$$

$$1.2c + 1.5e = (1.38)(30)$$

$$\underline{-1.2c - 1.2e = -36}$$

$$\frac{.3e = 5.4}{.3}$$

$$e = 18$$

$$c = 12$$

She should use
12 lb of the
cheaper candy

35.

	d	r	t
downstream	40	$r+5$	t
upstream	15	$r-5$	t

r = speed in
still water

$$40 = (r+5)t$$

$$15 = (r-5)t$$

$$t = \frac{40}{r+5}$$

$$t = \frac{15}{r-5}$$

$$\frac{40}{r+5} = \frac{15}{r-5}$$

$$40(r-5) = 15(r+5)$$

$$40r - 200 = 15r + 75$$

$$\underline{-15r + 200 \quad -15r + 200}$$

$$\frac{25r}{25} = \frac{275}{25}$$

$$r = 11$$

11 mph in
still water

$$\begin{aligned} 36. \quad 2x - 3y + z &= 5 \\ x + 3y + 8z &= 22 \\ 3x - y + 2z &= 12 \end{aligned}$$

$$\begin{aligned} x + 3y + 8z &= 22 \\ 3(3x - y + 2z &= 12) \end{aligned}$$

$$(10) \quad 3x + 9z = 27$$

$$(-3) \quad 10x + 14z = 58$$

$$\begin{aligned} 30x + 90z &= 270 \\ -30x - 42z &= -174 \\ \hline 48z &= 96 \\ 48 & \quad 48 \\ \hline z &= 2 \end{aligned}$$

$$z = 2$$

$$\boxed{(3, -1, 2)}$$

$$\begin{aligned} 2x - 3y + z &= 5 \\ x + 3y + 8z &= 22 \\ \hline 3x + 9z &= 27 \end{aligned}$$

$$\begin{aligned} x + 3y + 8z &= 22 \\ 9x - 3y + 6z &= 36 \\ \hline 10x + 14z &= 58 \end{aligned}$$

$$3x + 9(2) = 27$$

$$3x + 18 = 27$$

$$3x = 9$$

$$x = 3$$

$$2(3) - 3y + 2 = 5$$

$$-3y + 8 = 5$$

$$-3y = -3$$

$$y = -1$$

$$\begin{aligned} 37. \quad 4x + y + z &= 17 \\ x - 3y + 2z &= -8 \\ 5x - 2y + 3z &= 5 \end{aligned}$$

$$3(4x + y + z = 17)$$

$$x - 3y + 2z = -8$$

$$12x + 3y + 3z = 51$$

$$x - 3y + 2z = -8$$

$$13x + 5z = 43$$

$$2(4x + y + z = 17)$$

$$5x - 2y + 3z = 5$$

$$8x + 2y + 2z = 34$$

$$5x - 2y + 3z = 5$$

$$13x + 5z = 39$$

$$(-1) \quad 13x + 5z = 43$$

$$13x + 5z = 39$$

$$-13x - 5z = -43$$

$$0 = -4$$

$\boxed{\text{inconsistent}}$